PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: CX0102

ESSENTIAL OIL: CINNAMON CASSIA ORGANIC
BOTANICAL NAME: CINNAMOMUM CASSIA
ORIGIN: CHINA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CINNAMON CASSIA ORGANIC OIL	%
(E)-CINNAMAL	83.4
(E)-ORTHO-METHOXYCINNAMAL	5.1
COUMARIN	1.6

Comments from Robert Tisserand: Woody-spicy odor quality. Ten of twelve key ISO constituents are within range with two marginal ones that are not a concern.

Date : June 19, 2018

Certificate of Analysis – GC Profiling

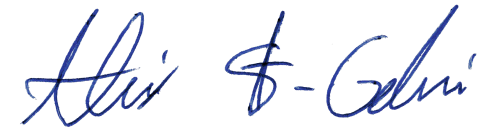
Sample identification

Internal code : 18F18-PTH6-1-CC
Customer identification : Cassia Organic - China - CX010278R
Type : Essential oil
Source : *Cinnamomum cassia*
Customer : Plant Therapy

Analysis

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.
Analyst : Sarah-Eve Tremblay, M. Sc. A., Chimiste
Analysis date : June 19, 2018

Checked and approved by :



Alexis St-Gelais, M. Sc., chimiste 2013-174

Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.

This report is digitally signed, it is only considered valid if the digital signature is intact.

Laboratoire PhytoChemia
628 Boulevard du Saguenay Ouest, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

PHYSICOCHEMICAL DATA

Physical aspect: Yellow liquid
Refractive index: 1.6065 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Acetic acid	tr	tr	Aliphatic acid
Isovaleral	tr	tr	Aliphatic aldehyde
2-Methylbutyral	tr	tr	Aliphatic aldehyde
Hexanal	0.01	0.01	Aliphatic aldehyde
Furfural	0.01	0.01	Aliphatic alcohol
(2*E*)-Hexenal	tr	tr	Aliphatic aldehyde
Ethylbenzene	0.03	0.03*	Simple phenolic
Styrene	0.16	0.16*	Simple phenolic
α-Thujene	tr	tr	Monoterpene
α-Pinene	0.06	0.06	Monoterpene
Camphene	0.04*	0.04	Monoterpene
α-Fenchene	[0.04]*	tr	Monoterpene
Thuja-2,4(10)-diene	tr	[0.03]*	Monoterpene
Benzaldehyde	0.85	0.87	Simple phenolic
Sabinene	0.03*	[0.03]*	Monoterpene
β-Pinene	[0.03]*	0.03	Monoterpene
6-Methyl-5-hepten-2-one	0.01	0.01	Aliphatic ketone
Benzofuran	tr		Simple phenolic
Myrcene	0.01	tr	Monoterpene
α-Phellandrene	tr	tr	Monoterpene
Octanal	tr	0.01	Aliphatic aldehyde
Δ3-Carene	tr	tr	Monoterpene
para-Cymene	0.02	0.02	Monoterpene
Limonene	0.03*	0.03	Monoterpene
1,8-Cineole	[0.03]*	0.01*	Monoterpenic ether
β-Phellandrene	[0.03]*	[0.01]*	Monoterpene
Salicylaldehyde	0.38	0.39*	Simple phenolic
(*Z*)-β-Ocimene	0.01	tr	Monoterpene
(*E*)-β-Ocimene	tr	tr	Monoterpene
γ-Terpinene	tr	[0.16]*	Monoterpene
Acetophenone	0.04	0.04	Simple phenolic
Terpinolene	0.03*	tr	Monoterpene
ortho-Guaiacol	[0.03]*	0.03	Simple phenolic
Linalool	0.01	0.01	Monoterpenic alcohol
Nonanal	tr	tr	Aliphatic aldehyde
Phenylethyl alcohol	0.74	0.76	Simple phenolic
ortho-Vinylanisole	0.03	0.03	Simple phenolic
trans-Pinocarveol	0.04*	[0.39]*	Monoterpenic alcohol
2-Methylbenzofuran	[0.04]*	0.01	Phenylpropanoid
Hydrocinnamal	0.96	0.89	Phenylpropanoid
Borneol	0.12	0.14*	Monoterpenic alcohol
3-Methylbenzofuran?	0.12	0.12	Phenylpropanoid
Terpinen-4-ol	0.03	0.03	Monoterpenic alcohol
para-Cymen-8-ol	tr	tr	Monoterpenic alcohol
α-Terpineol	0.05	[0.14]*	Monoterpenic alcohol
Methyl salicylate	0.01	0.01	Phenolic ester
(*Z*)-Cinnamal	0.53	0.51	Phenylpropanoid
Hydrocinnamyl alcohol	0.16	0.28	Phenylpropanoid

ortho-Anisaldehyde	0.47	0.39*	Simple phenolic
Phenylethyl acetate	0.03	0.04	Phenolic ester
(*E*)-Cinnamal	83.39	83.33	Phenylpropanoid
(*E*)-Cinnamyl alcohol	0.12	0.11	Phenylpropanoid
Hydrocinnamic acid	0.03	0.02	Phenylpropanoid
Eugenol	0.01	0.01	Phenylpropanoid
Cyclosativene I	0.03	0.04	Sesquiterpene
Cyclosativene II	0.04	0.02	Sesquiterpene
α-Ylangene	tr	tr	Sesquiterpene
ortho-Methoxyhydrocinnamal?	0.19	0.14	Phenylpropanoid
α-Copaene	0.40	0.39	Sesquiterpene
β-Elemene	0.02	0.12*	Sesquiterpene
β-Caryophyllene	0.14*	[0.12]*	Sesquiterpene
cis-α-Bergamotene	[0.14]*	0.04	Sesquiterpene
Coumarin	1.58*	1.59	Coumarin
trans-α-Bergamotene	[1.58]*	0.06	Sesquiterpene
(*E*)-Cinnamic acid	0.53*		Phenylpropanoid
(*E*)-Cinnamyl acetate	[0.53]*	0.46	Phenylpropanoid ester
allo-Aromadendrene	0.13	0.07	Sesquiterpene
(*Z*)-ortho-Methoxycinnamal	0.08	0.08	Phenylpropanoid
γ-Muurolene	0.12	0.14	Sesquiterpene
ar-Curcumene	0.08	0.09	Sesquiterpene
Viridiflorene	0.05	0.03	Sesquiterpene
α-Muurolene	0.08	0.08	Sesquiterpene
(3-Phenyloxiran-2-yl)methyl acetate	0.01	0.01	Aliphatic alcohol
γ-Cadinene	0.18*	0.07	Sesquiterpene
β-Bisabolene	[0.18]*	0.11	Sesquiterpene
δ-Cadinene	0.17*	0.13	Sesquiterpene
trans-Calamenene	[0.17]*	0.03	Sesquiterpene
(*E*)-ortho-Methoxycinnamal	5.11	5.02	Phenylpropanoid
α-Calacorene	0.03	0.03	Sesquiterpene
(*E*)-Nerolidol	0.11	0.11*	Sesquiterpenic alcohol
Spathulenol	0.01	tr	Sesquiterpenic alcohol
Caryophyllene oxide	0.10*	0.06	Sesquiterpenic ether
Caryophyllene oxide isomer	[0.10]*	0.02	Sesquiterpenic ether
Humulene epoxide II	0.01		Sesquiterpenic ether
Tetradecanal?	0.01	[0.39]*	Aliphatic aldehyde
1-epi-Cubenol	0.02	[0.11]*	Sesquiterpenic alcohol
Caryophylladienol II	0.02	0.02	Sesquiterpenic alcohol
τ-Cadinol	0.03*	0.02	Sesquiterpenic alcohol
τ-Muurolol	[0.03]*	tr	Sesquiterpenic alcohol
α-Muurolol	0.01	0.02	Sesquiterpenic alcohol
α-Cadinol	0.01	0.01	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.02	0.02	Sesquiterpenic alcohol
Cadalene	0.03	0.05	Sesquiterpene
Mustakone	0.02	0.03*	Sesquiterpenic ketone
(*E*)-ortho-Methoxycinnamyl acetate	0.16		Phenylpropanoid ester
α-Bisabolol	0.01	[0.03]*	Sesquiterpenic alcohol
Benzyl benzoate	0.05	0.05	Phenolic ester
Phenylethyl benzoate	0.03	0.04	Phenolic ester
Benzyl salicylate	0.01	tr	Phenolic ester
Dolabradiene	0.05	0.05	Diterpene

Manoyl oxide	tr	0.17	Diterpenic ether
Kaurene?	0.02		Diterpene
Phenylethyl (*E*)-cinnamate	0.02	0.01	Phenylpropanoid ester
Total identified	**98.32%**	**97.89%**	

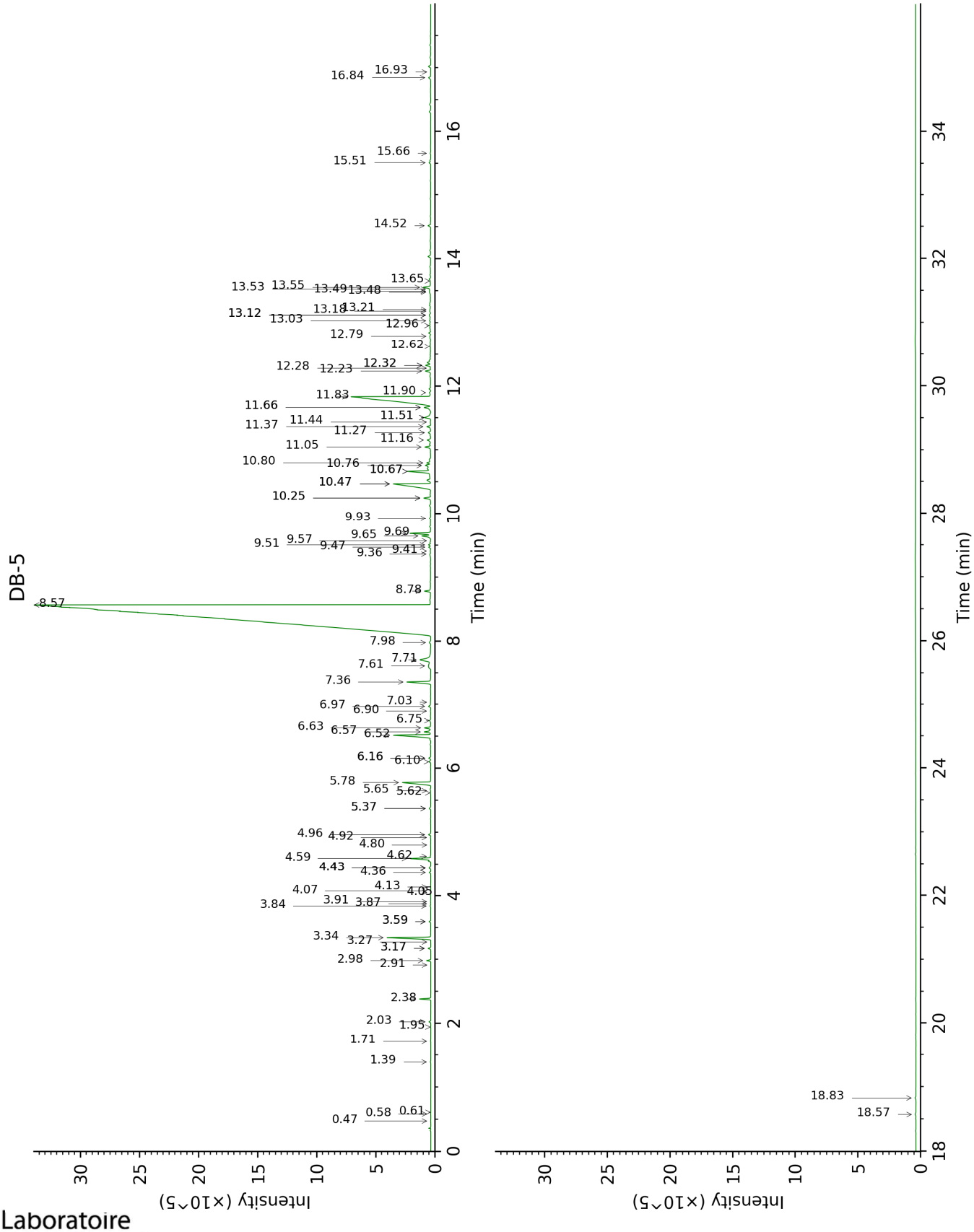
*: Two or more compounds are coeluting on this column
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total
tr: The compound has been detected below 0.005% of total signal.

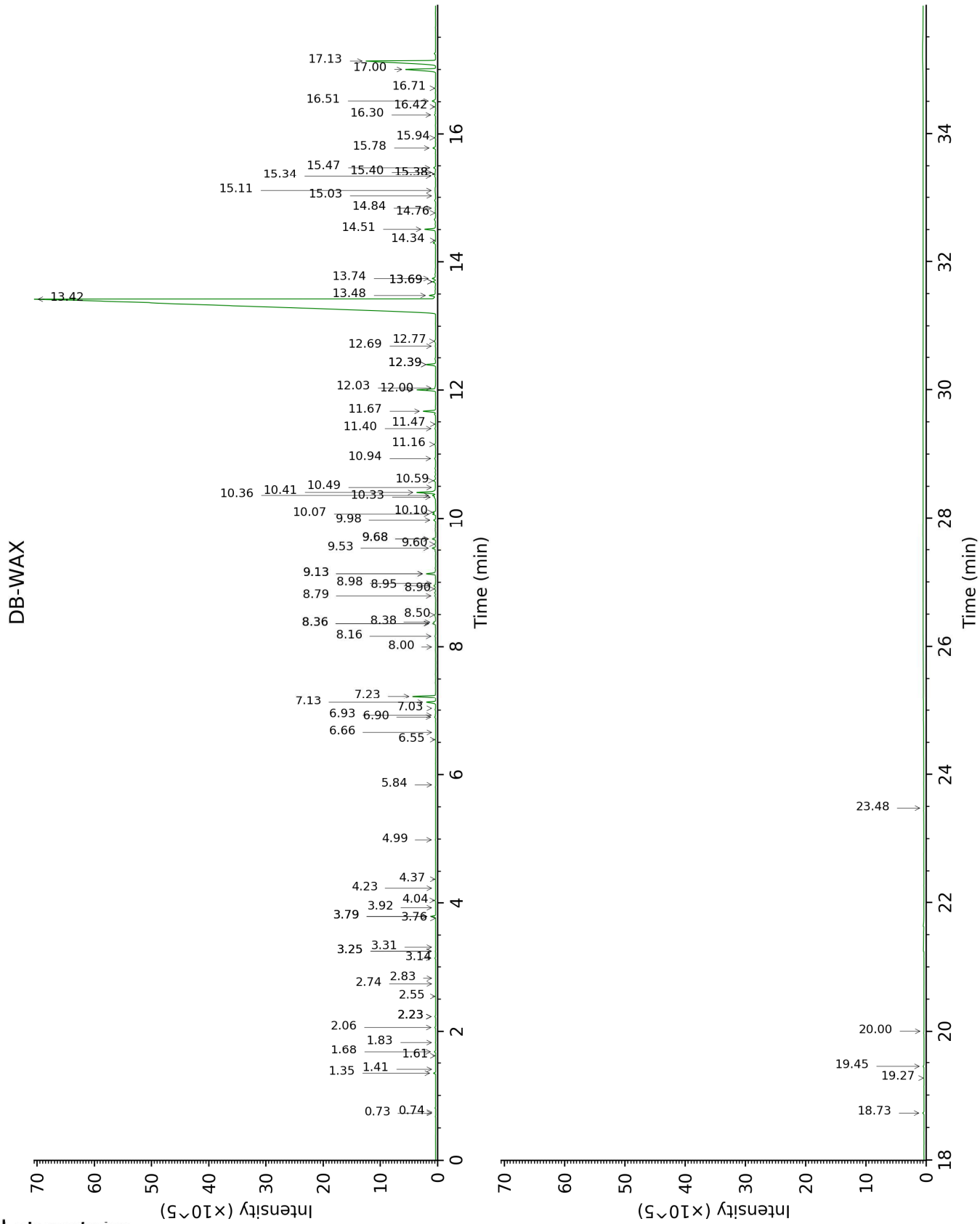
Note: no correction factor was applied

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

This page was intentionally left blank. The following pages present the complete data of the analysis.

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com


DB-5
Intensity (×10^5)
Time (min)
16.84
16.93
15.51
15.66
14.52
13.53
13.55
13.49
13.48
13.65
13.12
13.03
13.18
13.21
12.96
12.79
12.62
12.28
12.23
12.32
11.83
11.90
11.66
11.37
11.44
11.27
11.51
11.16
11.05
10.80
10.76
10.67
10.47
10.25
9.93
9.51
9.57
9.47
9.65
9.69
9.36
9.41
8.78
8.57
7.98
7.61
7.71
7.36
6.97
6.90
7.03
6.75
6.63
6.57
6.52
6.16
6.10
5.78
5.65
5.62
5.37
4.96
4.92
4.80
4.59
4.62
4.43
4.36
4.07
4.13
4.05
3.84
3.91
3.87
3.59
3.34
3.27
3.17
2.98
2.91
2.38
2.03
1.95
1.71
1.39
0.47
0.58
0.61
18.83
18.57


DB-WAX
Time (min)
Intensity (×10^5)
17.13
17.00
16.71
16.51
16.42
16.30
15.94
15.78
15.47
15.40
15.38
15.34
15.11
15.03
14.84
14.76
14.51
14.34
13.74
13.69
13.48
13.42
12.77
12.69
12.39
12.03
12.00
11.67
11.47
11.40
11.16
10.94
10.59
10.49
10.41
10.36
10.33
10.10
10.07
9.98
9.68
9.60
9.53
9.13
8.98
8.95
8.90
8.79
8.50
8.38
8.36
8.16
8.00
7.23
7.13
7.03
6.93
6.90
6.66
6.55
5.84
4.99
4.37
4.23
4.04
3.92
3.79
3.76
3.31
3.25
3.14
2.83
2.74
2.55
2.23
2.06
1.83
1.68
1.61
1.41
1.35
0.74
0.73
23.48
20.00
19.45
19.27
18.73

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetic acid	0.47	600	tr	6.66	1416	tr
Isovaleral	0.58	641	tr	0.74	884	tr
2-Methylbutyral	0.61	650	tr	0.73	878	tr
Hexanal	1.39	797	0.01	1.83	1045	0.01
Furfural	1.71	827	0.01	6.55	1408	0.01
(2*E*)-Hexenal	1.94	847	tr	3.31	1173	tr
Ethylbenzene	2.03	854	0.03	2.23*	1085	0.03
Styrene	2.38	885	0.16	3.79*	1209	0.16
α-Thujene	2.91	925	tr	1.41	1003	tr
α-Pinene	2.98	930	0.06	1.35	993	0.06
Camphene	3.18*	942	0.04	1.68	1030	0.04
α-Fenchene	3.18*	942	[0.04]	1.61	1024	tr
Thuja-2,4(10)-diene	3.27	949	tr	2.23*	1085	[0.03]
Benzaldehyde	3.34	954	0.85	7.23	1459	0.87
Sabinene	3.59*	971	0.03	2.23*	1085	[0.03]
β-Pinene	3.59*	971	[0.03]	2.06	1068	0.03
6-Methyl-5-hepten-2-one	3.84	987	0.01	4.99	1296	0.01
Benzofuran	3.87	989	tr			
Myrcene	3.91	992	0.01	2.83	1135	tr
α-Phellandrene	4.05	1001	tr	2.74	1128	tr
Octanal	4.07	1003	tr	4.37	1251	0.01
Δ3-Carene	4.14	1007	tr	2.55	1113	tr
para-Cymene	4.36	1021	0.02	4.04	1227	0.02
Limonene	4.43*	1026	0.03	3.14	1159	0.03
1,8-Cineole	4.43*	1026	[0.03]	3.25*	1168	0.01
β-Phellandrene	4.43*	1026	[0.03]	3.25*	1168	[0.01]
Salicylaldehyde	4.59	1036	0.38	9.13*	1605	0.39
(*Z*)-β-Ocimene	4.62	1038	0.01	3.76	1207	tr
(*E*)-β-Ocimene	4.80	1049	tr	3.92	1219	tr
γ-Terpinene	4.92	1057	tr	3.79*	1209	[0.16]
Acetophenone	4.96	1059	0.04	8.90	1587	0.04
Terpinolene	5.37*	1085	0.03	4.23	1241	tr
ortho-Guaiacol	5.37*	1085	[0.03]	11.40	1794	0.03
Linalool	5.62	1101	0.01	8.00	1517	0.01
Nonanal	5.65	1103	tr	5.84	1357	tr
Phenylethyl alcohol	5.78	1111	0.74	12.00	1847	0.76
ortho-Vinylanisole	6.10	1132	0.03	8.79	1578	0.03
trans-Pinocarveol	6.16*	1136	0.04	9.13*	1605	[0.39]
2-Methylbenzofuran	6.16*	1136	[0.04]	8.98	1594	0.01
Hydrocinnamal	6.52	1159	0.96	10.41	1710	0.89
Borneol	6.57	1162	0.12	9.68*	1649	0.14
3-Methylbenzofuran?	6.63	1166	0.12	10.07	1682	0.12
Terpinen-4-ol	6.75	1173	0.03	8.50	1556	0.03
para-Cymen-8-ol	6.90	1183	tr	11.47	1800	tr
α-Terpineol	6.97	1188	0.05	9.68*	1649	[0.14]
Methyl salicylate	7.03	1192	0.01	10.49	1716	0.01
(*Z*)-Cinnamal	7.36	1213	0.53	11.67	1818	0.51

Hydrocinnamyl alcohol	7.61	1230	0.16	13.48	1982	0.28
ortho-Anisaldehyde	7.71	1237	0.47	12.40*	1882	0.39
Phenylethyl acetate	7.98	1255	0.03	10.94	1754	0.04
(*E*)-Cinnamal	8.57	1294	83.39	13.42	1977	83.33
(*E*)-Cinnamyl alcohol	8.78	1309	0.12	15.78	2208	0.11
Hydrocinnamic acid	9.36	1350	0.03	19.27	2593	0.02
Eugenol	9.41	1354	0.01	14.76	2105	0.01
Cyclosativene I	9.47	1358	0.03	6.90	1434	0.04
Cyclosativene II	9.51	1360	0.04	6.93	1436	0.02
α-Ylangene	9.57	1365	tr	7.03	1444	tr
ortho-Methoxyhydrocinnamal?	9.65	1370	0.19	13.74	2007	0.14
α-Copaene	9.69	1373	0.40	7.13	1451	0.39
β-Elemene	9.93	1390	0.02	8.36*	1545	0.12
β-Caryophyllene	10.25*	1413	0.14	8.36*	1545	[0.12]
cis-α-Bergamotene	10.25*	1413	[0.14]	8.16	1530	0.04
Coumarin	10.47*	1430	1.58	17.00	2337	1.59
trans-α-Bergamotene	10.47*	1430	[1.58]	8.38	1547	0.06
(*E*)-Cinnamic acid	10.67*	1445	0.53			
(*E*)-Cinnamyl acetate	10.67*	1445	[0.53]	14.51	2081	0.46
allo-Aromadendrene	10.76	1452	0.13	8.95	1591	0.07
(*Z*)-ortho-Methoxycinnamal	10.80	1455	0.08	15.48	2177	0.08
γ-Muurolene	11.05	1473	0.12	9.53	1638	0.14
ar-Curcumene	11.16	1481	0.08	10.59	1725	0.09
Viridiflorene	11.27	1490	0.05	9.60	1643	0.03
α-Muurolene	11.36	1497	0.08	9.98	1674	0.08
(3-Phenyloxiran-2-yl)methyl acetate	11.44	1502	0.01	16.42	2275	0.01
γ-Cadinene	11.51*	1508	0.18	10.33	1703	0.07
β-Bisabolene	11.51*	1508	[0.18]	10.10	1684	0.11
δ-Cadinene	11.66*	1520	0.17	10.36	1706	0.13
trans-Calamenene	11.66*	1520	[0.17]	11.16	1773	0.03
(*E*)-ortho-Methoxycinnamal	11.83	1533	5.11	17.13	2352	5.02
α-Calacorene	11.90	1538	0.03	12.03	1850	0.03
(*E*)-Nerolidol	12.23	1565	0.11	13.69*	2002	0.11
Spathulenol	12.28	1569	0.01	14.34	2064	tr
Caryophyllene oxide	12.32*	1572	0.10	12.77	1916	0.06
Caryophyllene oxide isomer	12.32*	1572	[0.10]	12.69	1909	0.02
Humulene epoxide II	12.62	1596	0.01			
Tetradecanal?	12.79	1609	0.01	12.40*	1882	[0.39]
1-epi-Cubenol	12.96	1623	0.02	13.69*	2002	[0.11]
Caryophylladienol II	13.03	1629	0.02	15.94	2225	0.02
τ-Cadinol	13.12*	1636	0.03	14.84	2113	0.02
τ-Muurolol	13.12*	1636	[0.03]	15.03	2132	tr
α-Muurolol	13.18	1642	0.01	15.11	2141	0.02
α-Cadinol	13.21	1644	0.01	15.40	2170	0.01
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	13.48	1666	0.02	16.71	2306	0.02
Cadalene	13.50	1668	0.03	15.34	2163	0.05

Mustakone	13.53	1670	0.02	15.38*	2168	0.03
(*E*)-ortho-Methoxycinnamyl acetate	13.55	1672	0.16			
α-Bisabolol	13.65	1681	0.01	15.38*	2168	[0.03]
Benzyl benzoate	14.52	1755	0.05	18.73	2530	0.05
Phenylethyl benzoate	15.51	1843	0.03	19.45	2615	0.04
Benzyl salicylate	15.66	1857	0.01	20.00	2682	tr
Dolabradiene	16.84	1967	0.05	16.30	2262	0.05
Manoyl oxide	16.93	1976	tr	16.51	2285	0.17
Kaurene?	18.57	2139	0.02			
Phenylethyl (*E*)-cinnamate	18.83	2166	0.02	23.48	3137	0.01
Total identified		**98.32%**			**97.89%**	
Total reported		**98.32%**			**97.89%**	

*: Two or more compounds are coeluting on this column
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied
R.T.: Retention time (minutes)
R.I.: Retention index

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com